THE ARCTURUS OCEANOGRAPHIC EXPEDITION*

By William Beebe

(Fig. 1 and Plates A. B. C.)

OUTLINE

I. Introduction

The Arcturus Oceanographic Expedition, the ninth expedition of the New York Zoological Society, sailed from Brooklyn on February 11th, 1925, and returned to New York on July 30th. In the interval we steamed a distance of over 13,600 miles, touching at Norfolk, Bermuda, Panama, Cocos Island and the Galapagos. We brought back 11,000 feet of first rate motion picture film, besides a great many colored plates and photographs. We established one hundred and thirteen stations, made hundreds of hauls with nets and dredges, threw overboard two thousand drift bottles containing the usual data.

The avowed objects of the expedition were the investigation of the Sargasso Sea and the mid and deep sea life beneath it, and the study of the Humboldt Current. Owing to continual storms the former was in such a disintegrated condition that I soon decided to postpone detailed study until a more favorable time. In the Pacific, to our surprise, we found that there was absolutely no trace of the Humboldt Current about the Galápagos. The inexplicable absence of this great, cold, Antarctic current was amply compensated for by the equally unexpected presence of unusual natural events.

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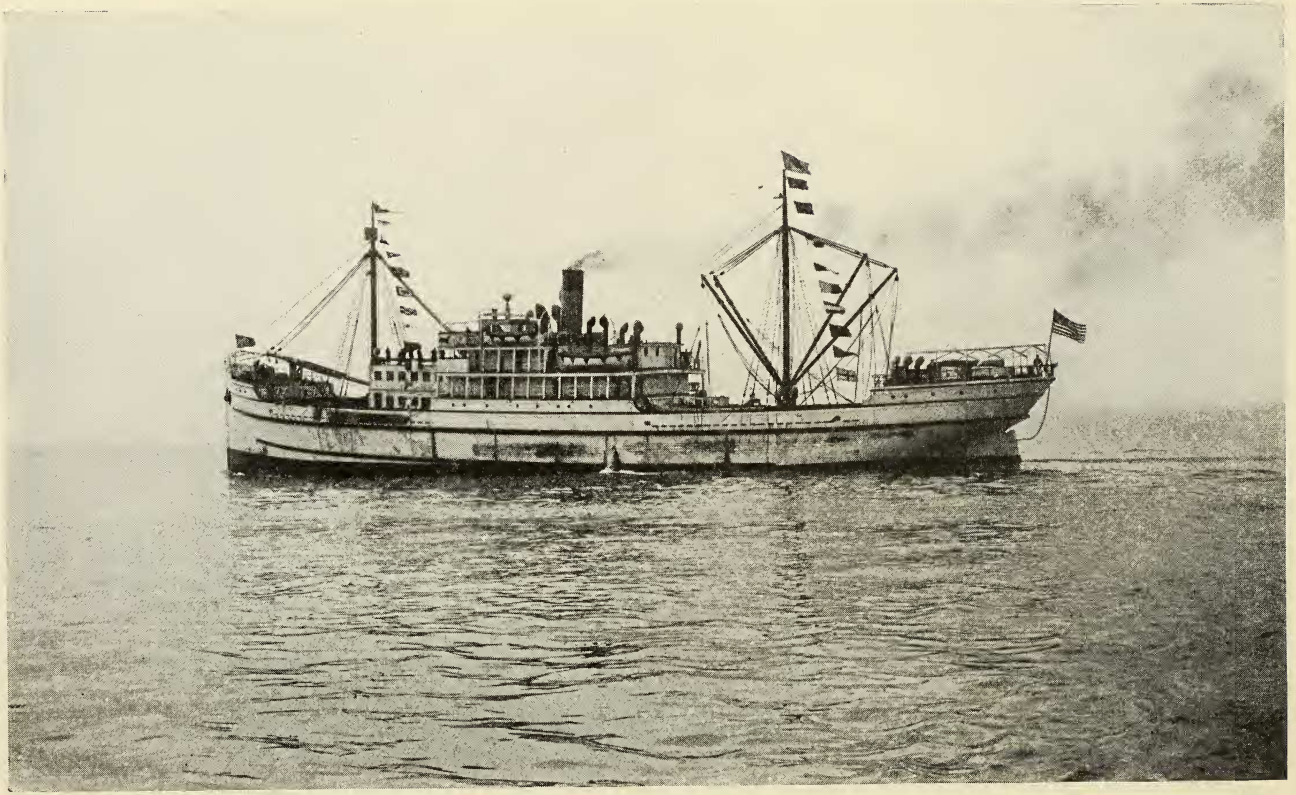

Fig. 1. S. Y. Arcturus.

Among the high lights of the expedition may be mentioned the great volcanic eruption on Albemarle Island, the albatross rookery on Hood, the remarkable results of hundreds of dives in a copper helmet and bathing suit in the shark-infested waters about Cocos and the Galapagos, a current rip, temporary and on an enormous scale in mid-Pacific. The accomplishment which, scientifically, proved to be the most valuable of all, was the result of my decision to make a ten-day stay in one spot in mid-ocean, Station 74, sixty miles south of Cocos where continual dredging yielded very remarkable collections of fish and crustaceans, equivalent to any two months of the less intensive work. The crustacea alone taken at this place equalled eighty percent of all the rest which we took in the Pacific.

Accurate accounts in popular language have already been brought out by me in "The Arcturus Adventure" published under the auspices of the Zoological Society by G. P. Putnam's Sons, New York City, a companion volume to "Galapagos: World's end."

The origin and evolution of life, men and expeditions are interesting. On the very day of my return from the Galapagos in the *Noma,* I was introduced to a recently elected member of the Board of Managers of the Zoological Society, Henry D. Whiton. Mr. Whiton said to me, "You seem tremendously interested in the Galapagos; if you ever want to go back there I will furnish the steamer if you can get someone else to provide the coal." So from this generous, tentative beginning there crystallized the twenty-four hundred ton steam yacht *Arcturus,* the specified coal, a splendid oceanographic outfit, a captain and a crew, and an expedition of six months' duration, which steamed from New York to the Sargasso Sea, thence to Cocos and the Galapagos, and which secured a host of treasures, from the most microscopic beings which contribute to the surface luminescence of the sea, to a giant devilfish weighing more than a ton.

The two chief contributors to the expedition were Henry D. Whiton, who gave the *Arcturus,* and Harrison Williams who provided three-fourths of the entire cost. Other generous contributors were Marshall Field, Clarence Dillon, Vincent Astor, The American Museum, George F. Baker, Jr., Arthur T. Newbold, Thomas S. Yates and Junius S. Morgan. Other gifts to be recorded are a sounding machine from William H. Trotter: Sets of Oceanographic books from Frederic C. Wolcott; motion picture negatives from George Eastman; Flashlights and batteries from the National

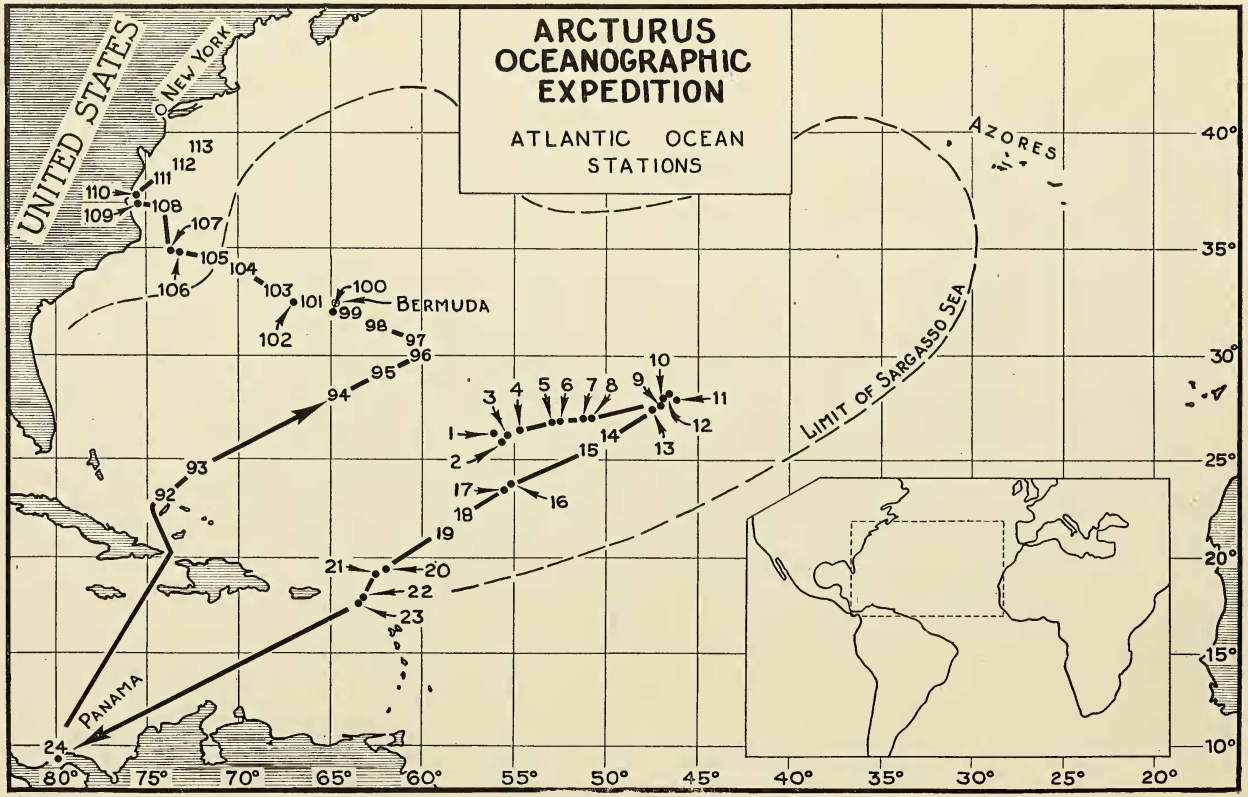

Plate A. Atlantic Ocean Stations. Arcturus Oceanographic Expedition.
From a drawing by John Tee-Van.

Carbon Co.; a powerful radio set from the Stromberg-Carlson Mfg. Co. and the launch *Pawnee* from Harry Payne Bingham. To Earnest Lester Jones, Chief of the Coast and Geodetic Survey, I am obliged for a host of kindnesses and the loan of valuable instruments, and to the U. S. Fisheries Bureau for the *Albatross* launch and much valuable gear.

The entire responsibility for the sea-going condition of the *Arcturus*, her complete overhauling and the supervision of the building of laboratories, dark-rooms, refrigerators, and oceanographic apparatus was assumed by Mr. J. R. Gordon and the naval architect, Edwin C. Bennett. Capt. Yates acted throughout for Mr. Williams, and it is to the whole-hearted enthusiasm and interest of these gentlemen that the smoothness of operation and general success of the mechanical basis of the expedition was due.

For Captain Howes and First Mate McLaughlin I have nothing but single-minded praise. No more willing, patient and capable seamen ever existed.

The scientific staff was of my own choosing, each of the seventeen members having a definite field of work, which they filled to the full extent of their ability. Without their loyalty, constant enthusiasm and coöperation, nothing of success could have been achieved.

The scientific working personnel was as follows: William Beebe, Director; W. K. Gregory, Associate in Vertebrates; L. Segal, Associate in Special Problems; C. J. Fish, Associate in Diatoms and Crustacea; John Tee-Van, General Assistant; William H. Merriam, Assistant in Field Work; Isabel Cooper and Helen Tee-van, Scientific artists; Ruth Rose, Historian and Technicist; Marie Fish, Assistant in Larval Fish; Elizabeth Trotter, Assistant in Fish Problems; Dwight Franklin, Assistant in Fish Preparation; Jay F. W. Pierson, Assistant in Macroplankton; Don Dickerman, Assistant artist; E. B. Schoedsack, Assistant in Photography; Serge Chetyrkin, Preparateur; D. W. Cady, Surgeon.

II. List of Stations with Accompanying Data

The abbreviations used in the individual hauls are as follows:

T—Tow net
PT—Petersen trawl
OT—Otter trawl
BT—Blake trawl
V—Vertical net
VC—Vertical closing net
D—Dredge
RSD—Rope scallop dredge

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul		Depth in Fathoms	Depth in Metres
		Lat. North	Long. West					H	M		
1	T1	26° 10′	56° 07′	580 m SE of Bermuda		Feb. 23	8.45 A.M.		15	0	0
	PT1						9.16 A.M.	1		0	0
	PT2										
	T2						12.30 P.M.	1		0	0
	T3						1.40 P.M.	1		0	0
	PT3						1.40 P.M.	1		0	0
	T4						2.40 P.M.	1		0	0
	V1									273–0	500–0
	T5						3.28 P.M.			0	0
2	T1	25° 56′	55° 42′	630 m. SE of Bermuda 625 m. NE of Sombrero		Feb. 23	8.00 P.M.	2		0	0
	T2						8.00 P.M.	2		0	0
3	T1					Feb. 24	4.00 A.M.	1		0	0
	T2						4.00 A.M.	1		0	0
	T3						6.00 P.M.		45	0	0
4	V1	26° 19′	54° 53′	650 m. SE of Bermuda	4000	Feb. 24	5.00 P.M.		30	278–0	510–0
	T1						6.30 P.M.	1			0
	T2						6.30 P.M.	1			0
5	V1	26° 42′	52° 59′	745 m. SE of Bermuda	3000	Feb. 25	1.56 P.M.		44	195–0	357–0
	T1						3.03 P.M.	1		109	200
	T2						3.03 P.M.	1		41.8	76.6
	PT						3.24 P.M.	1		41	75
	T3						3.30 P.M.	1			0
6	T1	26° 43′	52° 46′	720 m. SE of Bermuda		Feb. 25	7.50 P.M.		40		0
	PT1						7.40 P.M.	1		16.4	30
7	PT1	26° 54′	51° 15′	815 m. SE of Bermuda	3000	Feb. 26	10.51 A.M.			640	3000
8	T1	26° 58′	50° 52′	830 m. SE of Bermuda		Feb. 26	8.30 P.M.	1		0	0
	T2						8.30 P.M.	1			

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H	Duration of Haul M	Depth in Fathoms	Depth in Meters
		Lat. North	Long. West								
9	T1	27° 42′	46° 59′	1040 m. ESE of Bermuda	2529	Feb. 28	8.35 A.M.		30	0	0
	V1						2.47 P.M.		24	66–0	122–0
	T2						4.28 P.M.	1	53	273	500
	T3									546	1000
	T4									1093	2000
	T5									1367	2500
	T6									1640	3000
10	T1	27° 58′	46° 54′	1040 m. ESE of Bermuda		Mar. 1	8.50 A.M.	2	10	0	0
	T2						8.50 A.M.	2	10	0	0
	T3						8.00 P.M.	1		0	0
	T4						8.00 P.M.	1		0	0
11	D1	27° 53′	46° 24′	1070 m. ESE of Bermuda		Mar. 2	12.11 P.M.	1	4	2491	4557
	T1			1070 m. SW of Azores			7.30 P.M.	1	30	0	0
	T2						7.30 P.M.	1	30	0	0
	T3			1115 m. NE of Sombrero			7.30 P.M.	1	30	0	0
12	V1	27° 58′	46° 52′	1020 m. ESE of Bermuda	2180	Mar. 3	8.59 A.M.			109–0	200–0
	V2						9.22 A.M.		15	273–0	500–0
	VC1								37	546–273	1000–500
	VC2								14	1093–546	2000–1000
	VC3								57	1640–1093	3000–2000
13	T1	27° 44′	47° 10′	1030 m. ESE of Bermuda		Mar. 3	7.30 P.M.	1	20	0	0
	T2						7.30 P.M.	1	20	0	0
14	T1	26° 10′	50° 00′	890 m. NE of Sombrero		Mar. 4	7.45 P.M.	1			0
	T2						7.45 P.M.	1		0	0
	T3						7.45 P.M.	1			0
15	PT1	12 noon			2790	Mar. 5	10.20 A.M.	3	3	500	909
	PT2						10.20 A.M.	3	15	250	450
	PT3	25° 29′	51° 00′	830 m. NE of Sombrero			6.43 P.M.	1	12	250	450
	T1						6.45 P.M.	1	15	0	
	T2						6.45 P.M.	1	15	0	
	T3						6.45 P.M.	1	15	0	
16	PT1	23° 42′	55° 09′	570 m. NE of Sombrero		Mar. 7	9.30 A.M.	4		250	450
17	T1	23° 25′	55° 31′	540 m. NE of Sombrero		Mar. 7	8.00 P.M.	1		0	0
	T2						8.00 P.M.	1		0	0
18	T1	22° 13′	57° 44′	380 m. NE of Sombrero		Mar. 8	8.00 P.M.	1		0	0
	T2						8.00 P.M.	1		0	0

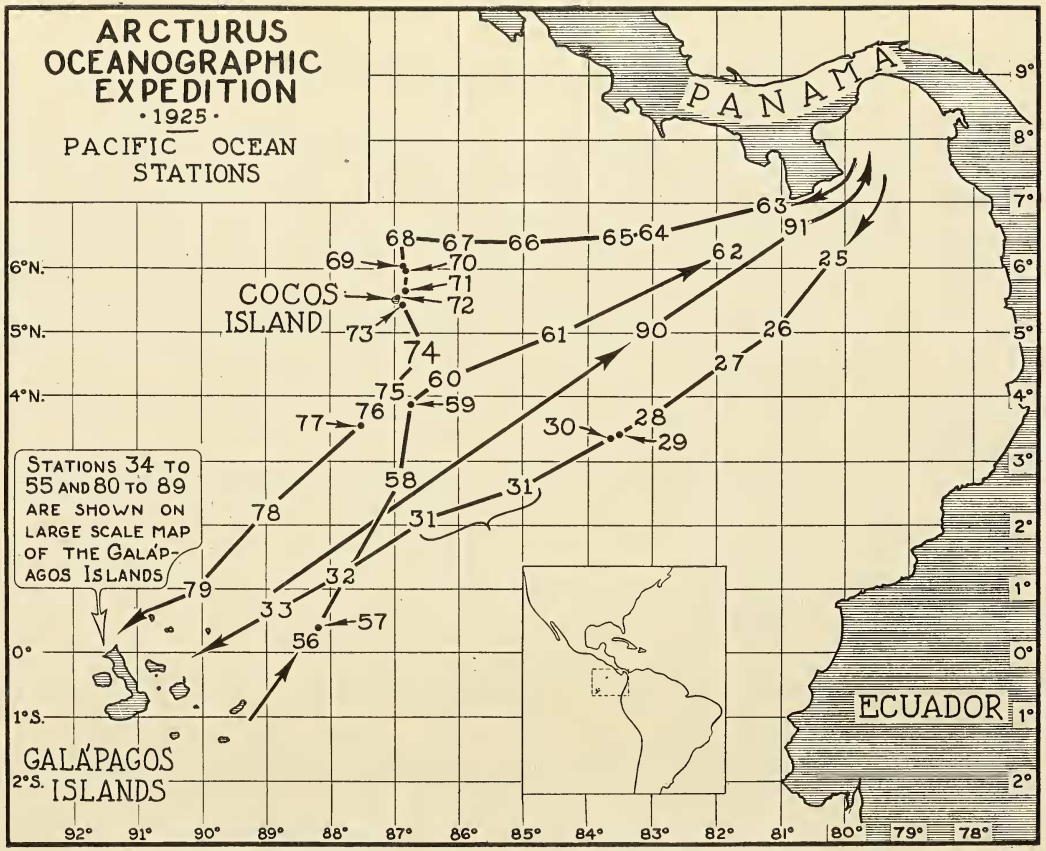

Plate B. Pacific Ocean Stations. Arcturus Oceanographic Expedition.

From a drawing by John Tee-Van.

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H	Duration of Haul M	Depth in Fathoms	Depth in Metres
		Lat. North	Long. West								
19	OT1	21° 10′	58° 46′	320 m. NE of Sombrero	3146	Mar. 9	10.00 A.M.	4		250	450
	PT1						2.30 P.M.	2		250	450
	T1						7.00 P.M.	2		0	
20	V1	19° 21′	61° 57′	100 m. NE of Sombrero		Mar. 12	2.52 P.M.		8	109–0	200–0
21	T1	10° 07′	62° 31′	65 m. NE of Sombrero		Mar. 12	8.00 P.M.	1		0	0
	T2						8.00 P.M.	1		0	0
	T3						8.00 P.M.	1		0	0
22	Dip Nets	17° 56′	63° 12′	8 m. S of St. Martin	200	Mar. 13	7.00 P.M.				
23	OT1	17° 39′	63° 17′	2 m. SW of Saba		Mar. 14	8.30 A.M.		15	45	82
	OT2						10.00 A.M.	1	30	250	450
	RSD1						1.30 P.M.	1		120	218
	RSD2						3.00 P.M.		10	120	218
23a	RSD1	17° 39′	63° 16′	2 m. SW of Saba		Mar. 15	1.27 P.M.		10	7	12.7
	RSD2						2.05 P.M.		10	54.6	100
	BT1						3.04 P.M.		10	54.6	100
	BT2						3.40 P.M.		9	70	127
	BT3						4.12 P.M.		10	71	130
23b	RSD1	17° 39′	63° 16′	2 m. SW of Saba	478	Mar. 15	9.15 A.M.		10	656	1200
	RSD2 (tangle)						10.58 A.M.		29	820	1500
24	dip nets	9° 22.5′	79° 56′	Colon, Panama		Mar. 21–27					
25	T1	6° 10′	80° 11′	65 m. S of Cape Malo		Mar. 29	7.00 P.M.	1		0	0
	T2						7.00 P.M.	1		0	0
	T3						7.00 P.M.	1		0	0
26	PT1	5° 03′	81° 18′	120 m. S of Mariato Point	2070	Mar. 30	9.13 A.M.	1		273	500
							7.30 A.M.	1			0
							9.50 A.M.		20		0
							9.50 A.M.		20		
							9.13 A.M.	1		136	250
							9.20 A.M.		40	19	35
27	T1	4° 30′	81° 49′	165 m. SW of Mariato Point		Mar. 30	7.00 P.M.		20	0	0
28	T1			260 m. SE of Cocos	1805	Mar. 31	5.15 A.M.		15	0	0
	T2						5.15 A.M.		15	0	0

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H	Duration of Haul M	Depth in Fathoms	Depth in Meters
		Lat. North	Long. West								
	T3						8.55 A.M.		15	0	0
	OT1						9.15 A.M.	1		273	500
29	T1	3° 23′	83° 33′								
	PT1										
	PT1			240 m. SE of Cocos		Mar. 31	3.50 P.M.		30	136	250
							3.50 P.M.		30	273	500
30	T1	3° 23′	83° 34′			Mar. 31	8.00 P.M.		20	0	0
	T2						8.00 P.M.		20	0	0
31	PT1	2° 36′	85° 01′	215 m. SSE of Cocos	1826	Apr. 1	8.45 A.M.		15	0	0
	PT2						9.15 A.M.		20	13.6	25
	PT3	2° 8′	86° 17′			Apr. 2	9.00 A.M.	1		0	0
	PT4	2° 4′	86° 31′				11.00 A.M.	2		273	500
	T1						11.00 A.M.	2		136	250
	OT1						4.00 P.M.	2	20	0	0
32	T1	1° 14′	87° 50′	140 m. N.E of Tower	1462	Apr. 3	5.40 A.M.		20	0	0
	T2						5.40 A.M.		20	0	0
33	T1	0° 40′	88° 51′	70 m. NE of Tower	1392	Apr. 3	2.00 P.M.	1	25	0	0
	PT1						2.27 P.M.	1		700	1274
	T2						8.00 P.M.		25	0	0
	T3						8.00 P.M.		25	0	0
34	T1	0° 00′	90° 00′	20 m. South of Tower	559	Apr. 4	5.30 A.M.		30	0	0
	T2						5.30 A.M.		30	0	
35				22 m. NE of Indefatigable	710	Apr. 4					
36	T1	0° 27′	90° 19′	1 m. W of Seymour		Apr. 4–6	9.30 A.M.		30	0	0
	T2						4.00 P.M.		30	0	0
37	T1	0° 19′	89° 57′	Darwin Bay, Tower		Apr. 7	7.30 P.M.		30	0	0
	T2					" 8	7.30 P.M.		30	0	0
	T3					" 9	11.00 A.M.		30	0	0
	T4					" 9	7.10 P.M.		20	0	0
	T5					" 10	7.30 P.M.		30	0	0
	T6					" 16	7.30 P.M.		30	0	0
	T7					" 17	7.30 P.M.		30	0	0
	T8					" 18	7.30 P.M.		30	0	0
	T9					" 19	7.30 P.M.		30	0	0

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H	Duration of Haul M	Depth in Fathoms	Depth in Metres
		Lat. North	Long. West								
38	PT1	0° 17′	90° 02′	7 m. W of Tower	448	Apr. 11	12.13 P.M.		62	360	545
	PT2						3.23 P.M.	1		500	909
	T1						6.45 P.M.		35	0	0
	T2						6.45 P.M.		35	0	0
39	T1	0° 05′	91° 11.5′	1 m. off NE coast of Albemarle	1039	Apr. 12	7.30 P.M.		30	0	0
	T2						7.30 P.M.		30	0	0
	T3						8.10 P.M.		30	0	0
	PT1					Apr. 13	10.48 A.M.	1	16	500	909
	T4						10.48 A.M.	1	16	250	450
	T5						7.15 A.M.		30	0	0
	T6						7.15 A.M.		30	0	0
	PT2						2.57 A.M.		57	600	1090
40	T1	0° 14′	91° 18′	5 m. N of Albemarle	1647	Apr. 14	4.20 A.M.		30		
	D1						11.11 A.M.	1	36		
41	T1	0° 31′	91° 00′	13 m. W of Abingdon	1409	Apr. 14	6.45 P.M.		30	0	0
	T2						6.45 P.M.		30	0	0
	T3						7.55 P.M.		10	0	0
42	T1	0° 32′	91° 06′	20 m. W of Abingdon		Apr. 15	4.50 A.M.		25	0	0
	T2						4.50 A.M.		25	0	0
43	D1	0° 34′	90° 47′	½ m. W of Abingdon	431	Apr. 15	10.48 A.M.		32	225	
	PT1										
44	PT1	0° 27′	90° 42′	Midway between Abingdon & Bindloe	548	Apr. 15	3.10 P.M.		50	250	450
45	OT1	0° 20′	90° 10′	12 m. W of Tower	493	Apr. 15	9.35 P.M.		33	205	372
	T1						9.30 P.M.		30	0	0
	T2						9.30 P.M.		30	0	0
	T3						9.35 P.M.		30	200	363
46				Darwin Bay, Tower							
47	T1	0° 03′	89° 50′	23 m. S of Tower		Apr. 20	9.30 P.M.		20	0	0
48	PT1	1° 20′ (S)	89° 33′	12 m. E of Hood	174	Apr. 21	4.18 P.M.		27	50	90
	T1						4.10 P.M.		25	0	0
	T2						4.18 P.M.		27	50	90
	T3						4.30 P.M.		15	0	0
49	PT1			10 m. SE of Hood	401	Apr. 21	7.40 P.M.		55	200	363

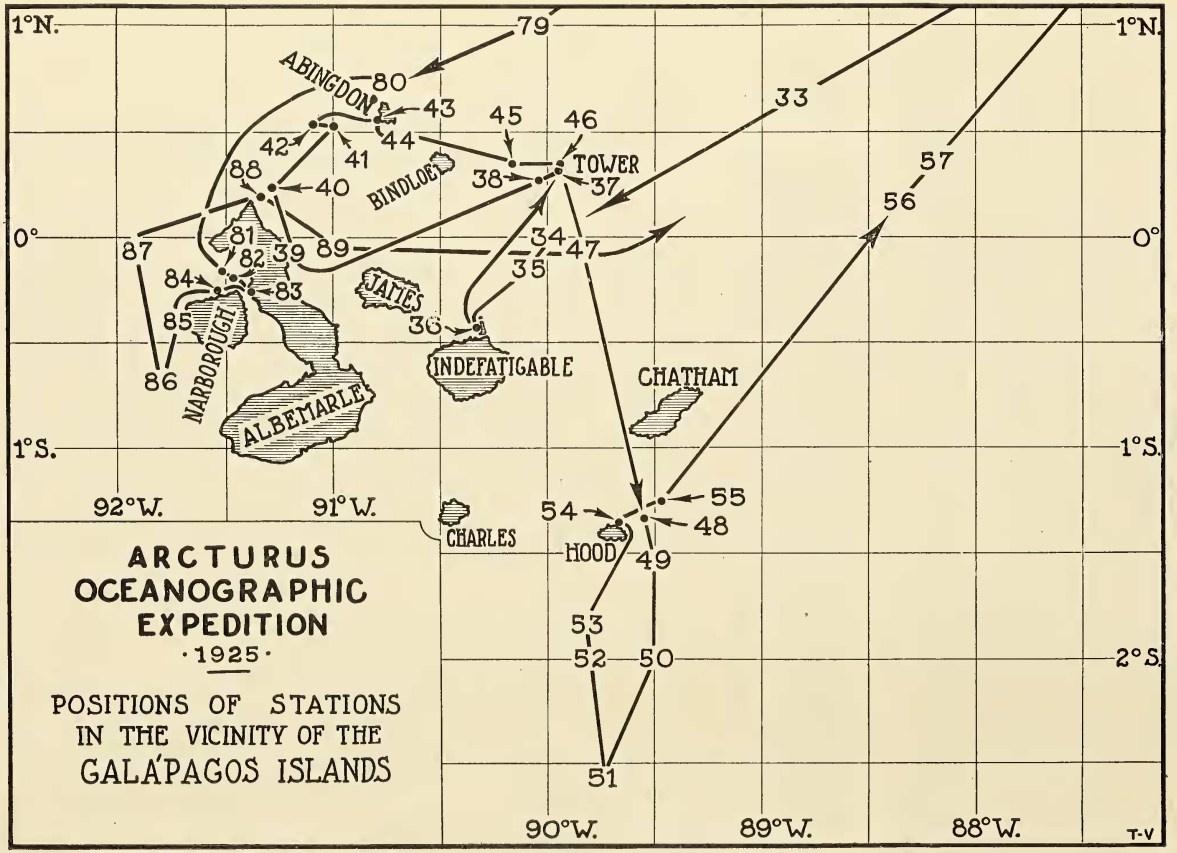

Plate C. Galapagos Islands' Stations. Arcturus Oceanographic Expedition.

From a drawing by John Tee-Van.

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H M	Depth in Fathoms	Depth in Meters
		Lat. North	Long. West							
	T1						7.40 P.M.	55	200	363
	T2						8.10 P.M.	20	0	0
50	T1	2° 00′ (S)	89° 30′	34 m. SE of Hood	1820	Apr. 22	12.40 P.M.	1 35	0	0
	T2						12.40 P.M.	1 35	400	727
	T3						12.40 P.M.	1 35	800	1454
	OT1						12.40 P.M.	1 35	800	1454
	T4						12.40 P.M.	1 35	1200	2181
	PT1						12.40 P.M.	1 35	1200	2181
	T5						7.00 P.M.	30	0	0
51	PT1	2° 33′ (S)	89° 44′	67 m. S of Hood	1835	Apr. 23	9.00 A.M.	2	273	500
	T1						9.00 A.M.	2	54	100
	T2						9.00 A.M.	2	164	300
	T3						9.00 A.M.	2	273	500
	PT2						2.00 P.M.	1 30	800	1454
	T4						2.30 P.M.	40	2.7	5
52	T1	2° 00′ (S)	89° 48′	34 m. S of Hood		Apr. 23	6.30 P.M.	30	0	0
	T2						7.30 P.M.	30	0	0
	T3						7.30 P.M.	30	0	0
	T4						9.00 P.M.	30	0	0
53	D1	1° 51′ (S)	89° 50′	25 m. S of Hood	1733	Apr. 24	9.40 A.M.	35	1733	3156
	T1					Apr. 25	9.40 A.M.	35	1093	2000
	T2						9.40 A.M.	35	800	1463
	T3						7.20 P.M.	25		0
	D2						7.00 A.M.	1	1733	3156
54	T1	1° 22′ (S)	89° 39′	Gardner Bay, Hood		Apr. 25	7.20 P.M.	25	0	0
	T2					Apr. 26	7.30 P.M.	20	0	0
	T3					Apr. 27	7.30 P.M.	20	0	0
55	T1	1° 16′ (S)	89° 28′	13 m NE of Hood		Apr. 28	8.00 P.M.	20	0	0
56	T1	0° 10′	88° 22′	98 m. E of Tower	1388	Apr. 29	3.04 P.M.	44	400	727
							3.04 P.M.	44	800	1463
							3.04 P.M.	44	800	1463
57	T1	0° 22′	88° 11′	105 m. E of Tower		Apr. 29	8.00 P.M.	30	0	0
	T2						8.00 P.M.	30	0	0
58	T1	2° 42′	86° 56′	170 m. S of Cocos		Apr. 30	8.00 P.M.	30	0	0
	T2						8.00 P.M.	30	0	0

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul		Depth in Fathoms	Depth in Metres
		Lat. North	Long. West					H	M		
59	T1	3° 52′	86° 43′	105 m. S of Cocos	796	May 1	5.15 A.M.		30	0	0
	T2						9.20 A.M.	1	45	100	181
	T3						9.20 A.M.	1	45	300	545
	T4						9.20 A.M.	1	45	500	909
	T5						9.20 A.M.	1	45	600	1090
	PT1						9.20 A.M.	1	45	600	1090
	T6						9.40 A.M.	1	20	0	0
	T7						2.15 P.M.	1	15	150	272
	T8						2.15 P.M.	1	15	300	545
	T9						2.15 P.M.	1	15	500	909
	T10						2.15 P.M.	1	15	600	1090
	PT2						2.15 P.M.	1	15	600	1090
60				90 m. SSE of Cocos							
61	T1	4° 56′	84° 35′	150 m. ESE of Cocos	1690.7	May 2	2.10 P.M.		50	0	0
	T2						1.50 P.M.	1	40	150	272
	T3						1.50 P.M.	1	40	300	545
	T4						1.50 P.M.	1	40	500	909
	T5						1.50 P.M.	1	40	600	1090
	PT1						1.50 P.M.	1	40	600	1090
62	T1	6° 16′	80° 48′	60 m. SW of Mariato Point		May 3	8.00 P.M.		30	0	0
63	T1	6° 58′	81° 08′	20 m W of Mariato Point		May 11	8.00 P.M.		30	0	0
	T2						8.00 P.M.		30	0	0
	OT1						8.00 P.M.		30	0	0
64		6° 34′	83° 00′	250 m. E of Cocos	1036	May 12					
65	T1	6° 30′	83° 33′	215 m. E of Cocos		May 12	6.00 P.M.		15	0	0
	T2						6.15 P.M.		15	0	0
	OT1						8.30 P.M.		30	0	0
	T3						8.00 P.M.		30	0	0
	T4						9.00 P.M.		30	0	0
66	T1	6° 24′	85° 00′	130 m. NE of Cocos	1125	May 13	10.10 P.M.	3		300	545
	T2						10.10 P.M.	3		500	909
	T3						10.10 P.M.	3		600	1090
	PT1						10.10 P.M.	3		600	1090
67	T1	6° 24′	86° 00′	78 m. NE of Cocos		May 13	8.05 P.M.		30	0	0
68	T1	6° 27′	86° 54′	50 m. N of Cocos	1676	May 14	5.00 A.M.		30	300	545

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H	Duration of Haul M	Depth in Fathoms	Depth in Meters
		Lat. North	Long. West								
	T2						9.12 A.M.	1	33	400	727
	T3						9.12 A.M.	1	33	500	909
	T4						9.12 A.M.	1	33	600	1090
	T5						9.12 A.M.	1	33	600	1090
	PT1										
69		5° 56′	86° 52′	20 m. N of Cocos	1334	May 14					
70	T1	5° 58′	86° 50′		1251	May 14	6.45 P.M.		30	0	0
	T2						7.55 P.M.		35	0	0
71		5° 38′	86° 48′	10 m. NE of Cocos	335	May 15					
72		5° 32′	86° 59′	Chatham Bay, Cocos		May 14–24					
73	T1	5° 28′	86° 54′	6 m. S of Cocos		May 24	8.00 P.M.		30	0	0
	T2										
74	T1	4° 50′	87° 00′	60 m. S of Cocos	514–900	May 25	9.30 A.M.	1	30	0	0
	T2						9.15 A.M.	1	33	150	272
	T3						9.15 A.M.	1	30	300	545
	T4						9.15 A.M.	1	30	500	909
	T5						9.15 A.M.	1	33	600	1090
	PT1						9.15 A.M.	1	33	600	1090
	T6						2.00 P.M.	1	47	350	636
	T7						2.00 P.M.	1	47	450	818
	T8						2.00 P.M.	1	47	500	909
	T9						2.00 P.M.	1	47	600	1090
	PT2						2.00 P.M.	1	47	600	1090
	T10						7.30 P.M.		30	0	0
	V1					May 26				546–0	1000–0
	V2									273–0	500–0
	V3									164–0	300–0
	VC2									382–273	700–500
	VC3									273–164	500–300
	V4									273–0	500–0
	VC4									273–0	500–0
	VC5									273–164	500–300
	V5									164–0	300–0
	VC6									546–382	1000–700
	V6									382–0	700–0
	VC7									710–546	1300–1000
	V7									546–0	1000–0
	T11						7.15 P.M.		45	0	0

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H M	Depth in Fathoms	Depth in Metres
		Lat. North	Long. West							
	T12						7.15 P.M.	45	0	0
	T13					May 27	9.45 A.M.	1	0	0
	T14						9.08 A.M.	1 37	300	545
	T15						9.08 A.M.	1 37	450	818
	T16						9.08 A.M.	1 37	550	1000
	T17						9.08 A.M.	1 37	600	1090
	PT3						9.08 A.M.	1 37	620	1127
	T18						2.19 P.M.	1 26	300	545
	T19						2.19 P.M.	1 26	450	818
	T20						2.19 P.M.	1 26	550	1000
	T21						2.19 P.M.	1 26	600	1090
	PT4						2.19 P.M.	1 26	600	1090
	T22						7.00 P.M.	30	0	0
	T23						7.30 P.M.	30	0	0
	T24						8.00 P.M.	30	0	0
	T25						8.30 P.M.	30	0	0
	OT1					May 28	9.47 A.M.	58	900	1636
	T26						7.30 P.M.	45	0	0
	OT2					May 29	9.00 A.M.	1 40	750	1363
	OT3						2.11 P.M.	1 29	833	1514
	T27						2.11 P.M.	1 29	500	909
	OT4					May 30	9.06 A.M.	1 31	625	1145
	OT5						2.03 P.M.	1 37	625	1145
	T28						7.00 P.M.	30	0	0
	T29						8.00 P.M.	30	0	0
74	OT6					May 31	lost			
cont.	D1						7.33 A.M.	2 27	844	1534
	T30						2.00 P.M.	30	0	0
	T31						3.00 P.M.	30	0	0
	T32						4.00 P.M.	30	0	0
	T33						5.00 P.M.	30	0	0
	T34						6.00 P.M.	30	0	0
	T35						7.00 P.M.	30	0	0
	T36						8.00 P.M.	30	0	0
	T37						9.00 P.M.	30	0	0
	T38						10.00 P.M.	30	0	0
	T39						11.00 P.M.	30	0	0
	T40					June 1	12.00 A.M.	30	0	0
	T41						1.00 A.M.	30	0	0

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H	Duration of Haul M	Depth in Fathoms	Depth in Meters
		Lat. North	Long. West								
	T42						2.00 A.M.		30	0	0
	T43						3.00 A.M.		30	0	0
	T44						4.00 A.M.		30	0	0
	T45						5.00 A.M.		30	0	0
	T46						6.00 A.M.		30	0	0
	T47						7.00 A.M.		30	0	0
	T48						8.00 A.M.		30	0	0
	D2						7.00 A.M.	3	40	787	1430
	T49						9.00 A.M.		30	0	0
	T50						10.00 A.M.		30	0	0
	T51						11.00 A.M.		30	0	0
	T52						12.00 P.M.		30	0	0
	T53						1.00 P.M.		30	0	0
	T54						2.00 P.M.			0	0
	T55						3.00 P.M.			0	0
	T56						4.00 P.M.			0	0
	T57						5.00 P.M.			0	0
	T58						6.00 P.M.		15	0	0
	T59						6.15 P.M.		15	0	0
	T60						6.30 P.M.		15	0	0
	T61						6.45 P.M.		15	0	0
	T62						7.00 P.M.		15	0	0
	T63						7.15 P.M.		15	0	0
	T64						7.30 P.M.		15	0	0
	T65						7.45 P.M.		15	0	0
	T66						8.00 P.M.	1		0	0
	T67						8.00 P.M.	1			
	OT7					June 2				749	1361
	T68						2.30 P.M.	1	30	300	545
	T69						2.30 P.M.	1	30	400	727
	T70									500	909
	T71									600	1090
	PT5									600	1090
	T72						7.00 P.M.	1		0	0
	T73						8.00 P.M.	1		0	0
	T74					June 3	9.32 A.M.	1	8	400	727
	T75						9.32 A.M.	1	8	400	727
	T76						9.32 A.M.	1	8	500	909
	T77						9.32 A.M.	1	8	600	1090
	T78						9.32 A.M.	1	8	700	1274
	PT6						9.32 A.M.	1	8	700	1274
	D3						1.45 P.M.	1	55	765	1390
75		4° 03′	87° 05′	90 m. S of Cocos		June 4					

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H	Duration of Haul M	Depth in Fathoms	Depth in Metres
		Lat. North	Long. West								
76		3° 45′	87° 22′	110 m. S of Cocos		June 4					
77	T1	3° 34′	87° 33′	125 m. S of Cocos	1205	June 4	8.00 P.M.	1		0	0
	T2										
78	T1	2° 12′	89° 01′	125 m. NE of Tower	1322	June 5	8.00 P.M.	1		0	0
	T2										
79		1° 00′	90° 04′	40 m. N of Tower	1249	June 6					
80	T1	00° 44′	90° 45′	7 m. N of Abingdon		June 6	8.00 P.M.		30	0	0
	T2										
	T3										
81		00° 10′ (S)	91° 31′	Banks Bay, Albemarle	118	June 7					
82		00° 12′ (S)	91° 28′	Banks Bay, Albemarle	953	June 7					
83		00° 16′	91° 23′	Tagus Cove, Albemarle		June 7–9					
84	T1	0° 17′ (S)	91° 34′	1 m. N of Narborough	627	June 9	1.45 P.M.	2		300	545
	T2						1.45 P.M.	2		400	727
	T3						1.45 P.M.	2		450	818
	T4						1.45 P.M.	2		500	909
	PT1						1.45 P.M.	2		500	909
	T5						7.30 P.M.		30	0	0
	T6						8 00 P.M.	1		0	0
	T7						9.11 P.M.	1	14	300	545
	T8						9.11 P.M.	1	14	400	727
	T9						9.11 P.M.	1	14	450	818
	T10						9.11 P.M.	1	14	300	545
	PT2						9.11 P.M.	1	14	500	909
	T11						1.55 P.M.	1	45	300	545
	T12						1.55 P.M.	1	45	400	727
	T13						1.55 P.M.	1	45	450	818
	T14						1.55 P.M.	1	45	500	909
	PT3						1.55 P.M.	1	45	500	909
	T15						7.00 P.M.	1		0	0
	T16						7.00 P.M.	1		0	0
	T17						8.00 P.M.	1		0	0
	T18						8.00 P.M.	1		0	0
	T19					June 11	2.06 P.M.	1	32	400	828
	T20						2.06 P.M.	1	32	500	909
	T21						2.06 P.M.	1	32	600	1090
	T22						2.06 P.M.	1	32	700	1274
	PT4						2.06 P.M.	1	32	700	1274

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H M	Depth in Fathoms	Depth in Metres
		Lat. North	Long. West							
85	T1	0° 25′	91° 42′	3 m. W of Narborough		June 11	8.00 P.M.	1	0	0
86	T1	0° 42′	91° 47′	16 m. SW of Narborough	1900	June 12	9.39 A.M.	51	400	727
	T2						9.39 A.M.	51	500	909
	T3						9.39 A.M.	51	600	1090
	T4						9.39 A.M.	51	800	1454
	T5						9.39 A.M.	51	1000	1818
	PT1						9.39 A.M.	51	1000	1818
	T6						2.15 P.M.	1 15	0	0
	T7						2.06 P.M.	1 18	400	727
	T8						2.06 P.M.	1 18	500	909
	T9						2.06 P.M.	1 18	600	1090
	T10						2.06 P.M.	1 18	800	1454
	T11						2.06 P.M.	1 18	1000	1818
	OT1						2.06 P.M.	1 18	1000	1818
87	T1	0° 00′	91° 53′	21 m. NW of Narborough	1720	June 13	9.11 A.M.	1 49	100	181
	T2						9.11 A.M.	1 49	400	727
	T3						9.11 A.M.	1 49	450	818
	T4						9.11 A.M.	1 49	500	909
	T5						9.11 A.M.	1 49	600	1090
	T6						9.11 A.M.	1 49	700	1274
	PT1						9.11 A.M.	1 49	700	1274
88	T1	0° 11′	91° 21′	3 m. N of Albemarle		June 13	8.10 P.M.	40	0	0
	T2						9.00 P.M.	30	0	0
	T3						9.35 P.M.	5	0	0
	T4						9.45 P.M.	5	0	0
89	T1	0° 02′	91° 01′	13 m. E of Albemarle		June 14	8.00 P.M.	1	0	0
90	T1	5° 04′	83° 04′	125 m. SE of Cocos		June 18	8.00 P.M.	30	0	0
	T2									
91	T1	6° 40′	80° 49′	25 m. S of Mariato Point		June 19	8.00 P.M.	30	0	0
	T2						8.00 P.M.	30	0	0
				Atlantic Ocean						
92	T1	22° 59′	74° 17′	60 m. S of San Salvador		July 3	8.00 P.M.	30	0	0
	T2						8.00 P.M.	30	0	0
93	T1	24° 31′	72° 24′	120 m. E of San Salvador		July 4	8.00 P.M.	30	0	0
	T2						8.00 P.M.	30	0	0
	T3						8.00 P.M.	30	0	0

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H M	Depth in Fathoms	Depth in Metres
		Lat. North	Long. West							
94	T1	28° 10′	64° 35′	250 m. S of Bermuda		July 9	8.00 P.M.	30	0	0
	T2						8.00 P.M.	30	0	0
	T3						8.00 P.M.	30	0	0
95	T1	29° 13′	62° 00′	270 m. SE of Bermuda		July 10	8.00 P.M.	30	0	0
	T2						8.00 P.M.	30	6 ft.	
	T3						8.00 P.M.	30	0	0
96	T1.	30° 00′	60° 00′	280 m. SE of Bermuda	2875	July 11	8.00 P.M.	30	0	0
	T2						8.00 P.M.	30	0	0
	T3						8.00 P.M.	30	0	0
	V1	30° 01′	60° 03′			July 12			546–0	1000–0
	V2								1093–0	2000–0
	T4						10.36 A.M.	2 28	150	272
	T5						10.36 A.M.	2 28	300	545
	T6						10.36 A.M.	2 28	500	909
	T7						10.36 A.M.	2 28	600	1090
	T8						10.36 A.M.	2 28	1200	2181
	PT1						10.36 A.M.	2 28	1200	2181
97	V1	30° 49′	61° 21′	190 m. SE of Bermuda		July 13	8.56 A.M.	24	820–0	1500–0
	V2						10.11 A.M.	28	546–0	1000–0
	VC1						11.20 A.M.	23	273–164	500–300
	VC2								478–324	893–593
	VC3						2.20 P.M.	30	546–437	1000–800
	VC4								437–273	800–500
	VC5								820–546	1500–1000
	T1						8.00 P.M.	30	0	0
	T2						8.00 P.M.	30	0	0
	T3						8.00 P.M.	30	0	0
98	VC1	31° 22′	62° 35′	125 m. SE of Bermuda	2587	July 14	10.44 A.M.	51	820–546	1500–1000
	V1						11.44 A.M.	11	164–0	300–0
	VC2						12.52 P.M.		1093–820	2000–1500
	V2								273–0	500–0
	V3						3.30 P.M.		437–0	800–0
	V4								546–0	1000–0
	V5						4.40 P.M.		820–0	1500–0
99		31° 57′	64° 00′	45 m. SE of Bermuda		July 15				
100	T1	32° 00′	65° 00′	10 m. S of Bermuda		July 15	8.00 P.M.	30	0	0
	T2						8.00 P.M.	30	0	0
	T3						8.00 P.M.	30	0	0

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul		Depth in Fathoms	Depth in Metres
		Lat. North	Long. West					H	M		
	T4						8.45 P.M.	1	45	0	0
	D1					July 16	8.35 A.M.		6	29	54
	D2						9.28 A.M.		12	29	53
	T5						11.49 A.M.	2	13	300	545
	T6						11.49 A.M.	2	13	400	727
	T7						11.49 A.M.	2	13	500	909
	PT1						11.49 A.M.	2	13	500	909
	T8						8.00 P.M.		30	0	0
	T9						8.00 P.M.		30	0	0
	T10						8.02 P.M.	1	1	200	363
	T11						8.02 P.M.	1	1	300	545
	T12					July 17	10.07 A.M.	3	1	0	0
	T13						10.07 A.M.	3	1	100	181
	T14						10.07 A.M.	3	1	200	363
	T15						10.07 A.M.	3	1	300	545
	T16						10.07 A.M.	3	1	400	727
	T17						10.07 A.M.	3	1	500	909
	T18						10.07 A.M.	3	1	600	1090
	T19						10.07 A.M.	3	1	700	1274
	T20						10.07 A.M.	3	1	800	1454
101		32° 26′	66° 23′	75 m. W of Bermuda	2624	July 18					
102	T1	32° 48′	67° 09′	120 m. W of Bermuda		July 18	8.00 P.M.		30	0	0
	T2						8.00 P.M.		30	0	0
103		32° 00′	68° 00′	160 m. W of Bermuda		July 19					
104		33° 58′	70° 21′	275 m. NW of Bermuda		July 20					
105	T1	34° 27′	71° 36′	210 m. ESE of Cape Hatteras	2803	July 20	1.48 P.M.	1	48	0	0
	T2						1.48 P.M.	1	48	250	450
	T3						1.48 P.M.	1	48	500	909
	T4						1.48 P.M.	1	48	600	1090
	T5						1.48 P.M.	1	48	700	1274
	T6						1.48 P.M.	1	48	800	1454
106		34° 44′	73° 20′	115 m. SE of Cape Hatteras		July 21					
107	T1	34° 47′	73° 41′	100 m. SE of Cape Hatteras		July 21	1.48 P.M.	1	52	0	0
	T2						1.48 P.M.	1	52	250	450
	T3						1.48 P.M.	1	52	500	909
	T4						1.48 P.M.	1	52	600	1090
	T5						1.48 P.M.	1	52	700	1274
	T6						1.48 P.M.	1	52	800	1454

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H	Duration of Haul M	Depth in Fathoms	Depth in Metres
		Lat. North	Long. West								
108	T1	36° 55′	74° 12′	90 m. E of Chesapeake Bay	1091	July 22	11.12 A.M.	1	49	0	0
	T2						11.12 A.M.	1	49	300	545
	T3						11.12 A.M.	1	49	400	727
	T4						11.12 A.M.	1	49	500	909
	T5						11.12 A.M.	1	49	600	1090
	T6						11.12 A.M.	1	49	700	1274
109	D1	36° 56′	75° 28′	30 m. E of Chesapeake Bay		July 23	8.45 A.M.		20	19	36
	D2						8.45 A.M.		20	32	60
110	T1	30° 16′	74° 58′	45 m. E of Chesapeake Bay		July 23	8.00 P.M.		30	0	0
111	PT1	38° 00′	74° 02′			July 24				60	109
	D1						9.07 A.M.		20	0	0
	D2						11.46 A.M.		54	382	694
112	T1	38° 31′	73° 12′	100 m. SE of Delaware Bay		July 24	8.00 P.M.		30	0	0
113	D1	39° 15′	72° 00′	125m. SE of City Hall, N. Y. City	950–1200	July 25	8.52 A.M.		31	633	1150
	T1						11.35 A.M.	1	27	300	545
	T2						11.35 A.M.	1	27	350	636
	T3						11.35 A.M.	1	27	400	727
	T4						11.35 A.M.	1	27	450	818
	T5						11.35 A.M.	1	27	500	909
	T6						10.00 P.M.		30	0	0
	T7						11.00 P.M.		30	0	0
	T8					July 26	12.00 A.M.		30	0	0
	T9						1.00 A.M.		30	0	0
	T10						2.00 A.M.		30	0	0
	T11						3.00 A.M.		30	0	0
	T12						4.00 A.M.		30	0	0
	T13						5.00 A.M.		30	0	0
	T14						6.00 A.M.		30	0	0
	T15						7.00 A.M.		30	0	0
	T16						8.00 A.M.		30	0	0
	T17						9.00 A.M.		30	0	0
	T18						10.00 A.M.		30	0	0
	T19						11.00 A.M.		30	0	0
	T20						12.00 P.M.		30	0	0
	T21						1.00 P.M.		30	0	0
	T22						2.00 P.M.		30	0	0
	T23						3.00 P.M.		30	0	0

Station Number	Individual Haul	Position		General Locality	Nearest Sounding in Fathoms	Date 1925	Time	Duration of Haul H M	Depth in Fathoms	Depth in Metres
		Lat. North	Long. West							
	T24						4.00 P.M.	30	0	0
	T25						5.00 P.M.	30	0	0
	T26						6.00 P.M.	30	0	0
	T27						7.00 P.M.	30	0	0
	T26						6.00 P.M.	30	0	0
	T27						7.00 P.M.	30	0	0
	T28						8.00 P.M.	30	0	0
	T29						9.00 P.M.	30	0	0
	VC1					July 27			437–273	800–500
	VC2								546–437	1000–800
	V1								546–0	1000–0
	V2								229	419–0
	V3								164–0	300–0
	V4								54–0	100–0
	V5									
	T30						3.20 P.M.	53	54	100
	T31						3.20 P.M.	53	109	200
	T32						3.20 P.M.	53	164	300
	T33						8.30 P.M.	30	0	0
	T34					July 28	9.29 A.M.	31	500	909
	T35						9.29 A.M.	31	600	1090
	T36						9.29 A.M.	31	700	1274
	T37						9.29 A.M.	31	800	1454
	T38						9.29 A.M.	31	900	1636
	T39						9.29 A.M.	31	1000	1818
	PT1						9.29 A.M.	31	1000	1818
	T40						2.04 P.M.	44	700	1274
	T41						2.04 P.M.	44	800	1454
	T42						2.04 P.M.	44	900	1636
	T43						2.04 P.M.	44	1000	1818
	T44						2.04 P.M.	44	1100	2000
	T45						2.04 P.M.	44	1200	2181
	PT2						2.04 P.M.	44	1200	2181
	T46						8.00 P.M.	30	0	0
	D2					July 29			69	127
	D3								69	127
	PT3								69	127

III. Chart of Centigrade Temperatures of Pacific Stations

Depths Metres	Sta. 26		Sta. 28		Sta. 31		Sta. 31B		Sta. 33		Sta. 35		Sta. 37		Sta. 38		Sta. 39		Sta. 40	
	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.
0	0	23.3	0	25.2	0	26.1	0	28.55	—	—	0	27.2	0	27.7	0	28.5	0	27.2	0	27.7
	0		—		0		0		—	—	0		0		0		0		0	
25					—	25.65	—	26.0	—	—	0	25.3	—	24.5	—	24.47	—	26.4	—	27.5
					—		—		—	—	0		—		—		—0.1		—	
50	—	14.3	—	16.9	0	25.55	0	27.1	—0.15	19.55	0	25.42	—0.1	19.82	* —0.1[1]	23.4	—	22.1	—0.15	19.32
															—0.05[2]	23.27				
	—		—		0		0		0		0		—0.05		—0.1[1]		—		—0.1	
															—0.1[2]					
75													—0.1	19.8					—0.1	19.1
																			—0.1	
100	—0.2	13.45	—0.2	13.9	—0.3	14.4	—	—			—0.2	15.45	—0.05	19.85			—0.05	22.25	—0.15	17.15
	—0.2		—0.2		—0.3		—	—			—0.2		—				—0.05		—0.15	
150													—							
													—0.05	19.85						
250							—0.25	13.52	—0.05	12.9					—0.15	13.15				
							—0.25		—						—0.2					
300	—0.2	11.19	—0.2	12.1	—0.25	13.54	—0.25	13.65			—0.15	13.62					—0.15	12.52	—0.2	12.4
	—0.2		—0.2		—0.25		—0.25				—0.15						—0.2		—0.2	
450							—0.25	11.52	—	8.5					—0.25	9.25				
							—0.2		—						—0.25					
500	—0.25	8.27	—0.3	8.17	—0.3	11.81	—0.2	12.65			—0.25	8.02					—0.15	11.4	—0.15	12.42
	—0.25		—0.25		—0.3		—0.2				—0.3						—0.25		—0.2	
1000	—0.3	4.59	—0.35	4.47																
	—0.35		—0.35																	
1500																				
2000																				
2500																				
3000																				

Depths Metres	Sta. 50		Sta. 51		Sta. 56		Sta. 59		Sta. 66		Sta. 68		Sta. 74		Sta. 84	
	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.	C.	C.T.
0	0	25.9	—0.05	23.45	0	27.2	0	27.5	0	28.5	0	28	0	27.5	0	22.1
	0		—		0		0		0		0		0		0	
25	—	—	—	22.1	—	23.2	—	27.9	—	26.5	—	28.65	—	27.1	0	20.6
	—		—		—		—		—		—		0			
50	—0.05	22.45	0	21.47	—0.15	18.75	+0.05	22.55	—0.15	18.3	—0.1	23.67	—0.1	19.97	—	22.0
	—		—0.05		—0.1		+0.05		—0.15		—0.05		—0.15		—	
75	—	17.7														
	—															
100	—0.15	15.45	—0.05	20.87	—0.1	16.25	—0.2	14.3	—0.2	13.97	—0.25	15.57	—0.25	14.57	—0.05	18.75
	—0.15		0		—0.15		—0.2		—0.2		—0.2		—0.2		—0.05	
150																
250																
300	—0.2	11.6	—0.2	11.9	—0.2	12.22	—0.25	11.3	—0.2	11.27	—0.25	11.20	—0.2	11.62	—0.2	11.8
	—0.2		—0.2		—0.25		—0.25		—0.25		—0.3		—0.2		—0.2	
450																
500	—0.25	8.32	—0.3	7.9	—0.25	8.25	—0.25	8.1	—0.25	7.92	—0.3	8.3	—0.25	8.35	—0.25	7.95
	—0.4		—0.3		—0.25		—0.25		—0.2		—0.3		—0.25		—0.25	
1000	—	4.8														
	—															
1500	—0.5	3.17														
	—0.45															
2000	—0.5	2.4														
	—															
2500	—0.45	1.95														
	—0.55															
3000	—0.45	1.72														
	—0.5															

Note: C. = Correction.
C.T. = Corrected Temperature—or average of 2 corrected readings.
* 2 sets thermometers taken at this depth: [1] = first set, [2] = second set.

IV. Chlorine in Sea Water 0/00.

BY TITRATION WITH SILVER NITRATE

Made by John B. Wilson, Assoc. Chemist.

Bureau of Chemistry, U. S. Department of Agriculture

Station No.	Surface	25M	50M	75M	100M	250M	300M	450M	500M	1000M	1500M	2000M	2500M	3000M
3.							19.36							
5.	20.46													
9.	20.46		19.48				20.11		19.92	19.57				
15.	20.46		20.52		20.64		20.70		20.26	19.74				
16.	20.35				20.60		20.26		19.97	19.46	19.28			
20.	20.00				20.16		20.05		19.51	19.26	19.40			
26.	18.92		19.45		19.37		19.22		19.22					
28.	18.70		19.21		19.38		19.31		19.21	19.17				
31.	18.75	18.74	18.74		18.89				19.23					
31B.	18.33		18.80		18.44	19.29	19.27	19.33						
33.			19.47			19.30		19.15	19.34					
35.	18.87	18.89	19.26		19.40		19.31		19.22					
38.	18.62	18.76	18.95			19.25								
39.	18.66	18.69	19.16		19.36		19.24							
40.	18.46	17.79	19.17	19.45			19.29		19.34					
50.	18.78	19.12	19.28	19.44	19.34		19.30		19.20	19.06	19.11	19.11	19.14	19.19
51.	18.91	19.45	19.54		19.48		19.34		19.04					
56.	18.77	18.96	19.44		19.39		19.36		19.20					
59.	17.76	18.17	18.86		19.30		19.17		19.10					
66.	17.79	18.73	19.16		19.27		19.32		19.18					
68.	18.24	18.61	19.06		19.25		19.25		19.16					
74.	17.88	18.25	19.98		19.38		19.25		19.10					
84.	19.32	19.32	19.56		19.45		19.22		19.18					
96.	20.14				20.21		20.23		20.08	20.03	19.39			
98.	20.20				20.20		20.13		20.14	19.59	19.36			
99.	20.19				19.25		20.14			20.15				
101.	20.10				19.85		20.11		20.06	19.58	19.39			
103.	19.97				20.16		20.20		20.18	19.55	19.41			
104.	20.00				20.15		20.14		20.16	19.46				
105.									19.76	19.41				

Land-locked Lagoon, Tower Island April 17, '25	Surface.	Edge	22.14
Land-locked Lagoon, Tower Island April 17, '25	Surface.	Center	25.40
Green Water, near Volcano, Albemarle Island			18.72

V. Résumé of Station and Haul Results

As introduction to this preliminary survey of the plankton hauls of the Arcturus Expedition it may be worth while to quote a few paragraphs from one of my recently published popular accounts.*

One dark, moonless evening I put out a silk surface net the mouth of which was round, and about a metre, or a yard, in diameter.

At the further end of the net a quart preserve jar was tied to receive and hold any small creatures which might be caught as the net was drawn slowly along the surface of the water. This was done at the speed of two knots, and, as I have said, was continued for the duration of one hour. When drawn in, the net sagged heavily and we poured out an overflowing mass of rich pink jelly into a white, shallow tray. This I weighed carefully, and then took, as exactly as possible, a one-hundred-and-fiftieth portion. I began to go over this, but soon became discouraged, and again divided it and set to work on one-sixth of the fraction on which I had first started. After many hours of eye-straining and counting under the miscroscope, I conservatively estimated my one-hundred-and-fiftieth part of the hour's plankton haul as follows:—

Feathery copepods—Candace-like	7,920
Bright blue copopods—Pontella-like	71,400
Other copopods—Calanus-like	139,320
Bivalve crustacea—Ostracods	4,920
Short-eyed shrimps	720
Siphonophores	14,400
Heliced snails	8,880
Purple Ianthina snails	13,440
Egg masses of snails	1,080
Free eggs, various	5,280
Clio-like pteropods	2,520
Limacina-like pteropods	240
Cavolinia-like pteropods	960
Total of specimens	271,080

If we multiply this by one hundred and fifty we get forty million, six hundred and sixty-two thousand individuals. Please remember that this is a very conservative estimate of only a few of the more easily counted groups in one small haul of an hour's duration, and the magnitude of the life of the sea will begin to dawn

* The Arcturus Adventure, pp. 199–200.

upon our minds. Twelve hours later—in full daylight—I repeated the haul as closely as possible and, instead of forty million, I captured about one thousand individuals of the corresponding groups.

The above figures give a more vivid meaning to the terms of relative occurrence, such as Abundant, Common and Many, which I have used in the following data. At my suggestion Dr. C. J. Fish kept a relatively accurate tally of the more easily recognizable groups of invertebrates of the plankton hauls, while I made a corresponding catalogue of the fish. For this purpose there was no attempt at specific identification, but the mere listing, in relative abundance, of the hundred-odd groups which leaped to the eye out of the quarts of millions of living organisms.

Reference to the Station data given in preceding pages will furnish the details of each haul, which can then be correlated with the present scheme. Future papers will present the exact identification of the various components.

As regards the symbols of relative abundance and rarity, after considerable thought, I have altered the scheme which I use in ecological work in the jungle,* and have made a compromise with that of Dr. Fish. This is as follows:—

A—Exceedingly Abundant
C—Common; Abundant
M—Many
F—Few
R—Rare; Very Few

Applying this to the count made on page 27 I should adopt the following:

A—Calanus copepods	139,320
C—Pontella copepods	71,400
M—Siphonophores	14,400
F—Limacina pteropods	240

The sequence of groups under each haul is by relationship. In the case of unidentified species I have sometimes used arbitrary popular names which at least indicate the general group.

* Zoologica, VI, No. 1, p. 43.

VI. Pacific Depth Plankton Hauls

As closing nets were not used, there is, in the following tables, a small percentage of error, from the organisms, however few in number, which entered the nets during their comparatively rapid ascent to the surface. Rather than attempt to orient these I have chosen to include the sporadic occurrence of such obviously out-of-place organisms as Halobates at 300 and 600 fathoms and Glaucus, Ianthina and Pontella at 600 and 800 fathoms.

20—Fathom Plankton

Station and Haul	26 OT1
Siphonophores (transparent)	M
Jellyfish (transparent)	F
Sagitta (large)	A
Firola	M
Copepods	R
Eucalanus	R
Amphipods	M
Hyperid Amphipods	M
Lucifer	M
Macruran larvae	M
Bachyura megalops	1
Squilla larvae	C

50—Fathom Plankton

	48 T2
Hydromedusae	M
Sagitta (small)	C
Tomopteris	1
Creseis acicula	C
Cresia conica	C
Cavilina uncinata	2
Copepods (small pink)	C
Eucalanus	F
Hyperids (yellow)	F
Euphausids (young)	F
Porcellana larvae	1
Halobates	1

100—Fathom Plankton

	59 T2	86 PT1	87 T1
Heliozoans (red)	M		
Radiolarians			M
Liriope			1
Tomopteris	1		
Gastropods	F		
Atlanta	2	1	
Cymbulia sibogae	1		
Copepods (small pink)	F		
Caligus (brown)			F
Hyperids (yellow)			1
Gnathophausia willemoesia		F	
Euphausids	F		
Macrurans (red)		R	

150—Fathom Plankton

	26 T4	29 T1	31 T1	51 T2	59 T7	61 T2	74 T2
Siphonophores	M		M				C
Pleurobrachia (small)						F	
Beroe (pink)						F	
Annelids	1						R
Tomopteris	R						
Sagitta	C		F		F	R	F
Clio	C						
Firola	F			R		F	F
Hyalocylix striata		F	C		M	M	M
Creseis		R	C				R
Cavolina longirostris			M				
Atlanta				R			
Clionopsis grandis				R			
Diacra quadridentata						R	R
Limacina inflata							A
Cymbulia sibogae					A		

150—Fathom Plankton (*Continued*)

	26 T4	29 T1	31 T1	51 T2	59 T7	61 T2	74 T2
Glaucus			2				
Ostracods (small white)						C	F
Ostracods (orange)	F				F	F	F
Copopods (small pink)				C	F	M	
Eucalanus elongatus	A			M			R
Pontella			C		R		
Sapphirina	F		R				F
Mysids			R		R		
Candace					R		
Hyperids	M		A				
Phronima					M	M	M
Oxycephalids							R
Gammarids (orange)							F
Other Amphipods	R	R	A	F	F		
Euphausids		C				A	R
Brachyura megalops		1					
Nauplius		1					
Phyllosoma			3				
Squilla larvae	F						
Salpa			C				R

200—Fathom Plankton

	49 PT1
Sagitta (large, transparent)	R
Limacina inflata	C
Limacina lesueuri	C
Creseis acicula	M
Creseis conica	M
Copepods (Small pink)	M
Pontella	M
Mysids	R
Euphausids (small, white)	C
Euphausids (pale pink)	1
Megalops	A
Phyllosoma	Z
Squilla larvae	C

300—Fathom Plankton

	26 PT1	28 PT1	51 T3	51 PT1	59 T3	59 T8	61 T3	66 T1	68 T2	74 T3	74 T14	74 T18	84 T1	84 T7	84 T11
Medusae (transparent)							R								
Beroe (small)									R					R	
Pleurobrachia									R						
Atolla														R	
Diphyes															R
Siphonophores							C				R		R	R	
Pelagothuria															R
Annelids (brown)														R	
Annelids (pink)					R									F	
Sagitta (large white)	C			M	R			R						F	F
Sagitta (pink)			R		R			R							
Firola	M	F	F		R		R	R							R
Clio	M									R					
Diacra quadridentata										R					
Diacra trispinosa			R	R											
Cavolina uncinata			R								R				
Clionopsis grandis			R												
Cymbulia sibogae					R	F									
Creseis acicula								R							
Hyalocylix								R					R		
Atlanta								R		R					
Glaucus							R[1]								
Ostracods (orange)					R			R		C	R				
Copepods (small pink)					A			R				F		F	

300—Fathom Plankton (*Continued*)

	26 PT1	28 PT1	51 T3	51 PT1	59 T3	59 T8	61 T3	66 T1	68 T2	74 T3	74 T14	74 T18	84 T1	84 T7	84 T11
Copepods (large red)	F			F	F										
Eucalanus					A	A	A	A	M	A		M	F	F	A
Pontella													F		
Lucifer										R					
Gnathophausia (small red)					R									R	
Phronima			R	R	F	R									
Amphipods (orange)				F	F				R						R
Hyperids					R										
Oxycephalids										R			R	R	
Gammarids (orange)													F		
Amphipods (transparent)							F								
Amphipods (pale slate)							M								
Euphausids (pink patches)			R			C		M	A	C	R	F			F
Euphausids (small white)						M					C	F	A		
Other Schizopods	C														
Macrurids (red and white)														R	
Megalops (red)															R
Shrimps (scarlet)	M				F										
Shrimps (orange)	F														
Salpae	M									R					
Doliolum	A				M										
Pyrosoma					R										
Halobates									R[1]				R[8]		

400—Fathom Plankton

	50 T2	56 T1	68 T3	84 T8	84 T19	86 T1	87 T2
Ctenophores (orange)		R		F			
Beroe (pink)				R			
Atolla				R			
Actinarians (orange)				F			
Siphonophores	R						
Porpita	R[2]		R[1]				
Pelagothuria						R	R
Annelids (large white)				R			
Sagitta (large white)	R						F
Eukrohnia (pink)	F	M		R	R	F	F
Firola			R				
Cymbulia		R			R		F
Clio pyramidata	F				F	R	
Clionopsis krohni					R		
Limacina	F						
Hyalocylix	F						
Creseis conica	F						
Creseis acicula	R						
Atlanta	R						
Limacina	R						
Cavolina	R						
Diacra trispinosa	R						
Cymbulopsis	F						
Glaucus	R[3]		R[2]				
Ianthina	R[1]						
Squids			R				
Ostracods	F		F				
Copepods (large red)	F			M	F	F	M
Eucalanus	A		A		M	C	F
Pontella	R						
Gnathophausia willemoesia		R				F	R
Isopods (black)						R	R
Hyperids	F	F					
Phronima	F			R			
Gammarids (pink)						M	
Oxycephalids			R	M		F	R
Other Amphipods (white)	M						

400—Fathom Plankton (*Continued*)

	50 T2	56 T1	68 T3	84 T8	84 T19	86 T1	87 T2
Amphipods (orange)					R	R	
Euphausids (adults)	M	M	M	F	M	C	M
Macrurids (red)		F			F		F
Lucifer	M						
Eryoneicus						R	
Squilla (larvae)	R						
Salpa			R				

450—Fathom Plankton

	74 T7	74 T15	74 T19	84 T3	84 T9	84 T13	87 T3
Actinians (orange)					R		
Periphylla					R		
Hydromedusae (white)	R						
Hydromedusae (yellow)			R				
Siphonophores		R		R			
Ctenophores		R					
Beroe				R			R
Annelids (orange)		R			M		
Eukrohnia (orange)	F		F		R		
Clio balantium	R						
Cymbulia	R						
Diacra quadridentata		R					
Peraclis			R				
Firola				F	R		
Ostracods (red)	F		R	R			
Copepods (red zone)	M	F		C		C	
Eucalanus		A	M			A	
Mysids (red)	R						
Gnathophausia (small red)			R	F	F	F	
Hyperids (small pink)		R					
Gammarids (orange)					R		
Phronima	R	R	R				
Oxycephalids	R	R		R	R		
Amphipods (large red)	F	R	F				R
Euphausids (red)	R	F	F				
Euphausids (small white)		A					
Eucopa (deep red)							R
Macrurids (red and white)					F	F	

450—Fathom Plankton (*Continued*)

	74 T7	74 T15	74 T19	84 T3	84 T9	84 T13	87 T3
Megalops (pink)				F			
Lucifer				F			
Shrimps (small red)			R				
Benthophausia (orange)					F		
Squilla (larvae)				R		R	
Isopods (brown)	R		R	F			

500—Fathom Plankton

	59 T4	59 T9	61 T4	66 T2	74 T4	74 T8	74 T27	84 PT1	84 T10	84 T14	84 PT3	84 T20	86 T2
Medusae (small white)		M											
Pleurobrachia (pink)		C	F		R								
Beroe (pink)			R			R		R	F	R			
Periphylla			R										
Atolla					F	R							
Actinians (larval scarlet)										M			
Annelids (yellow)										F			
Annelids (orange)	F												
Sagitta (salmon)	M	M	M	M	F	F	F	R				F	R
Sagitta (transparent)	R		F										
Planarians (orange)		R											
Nemertians													R
Firola	R		F	F	R			R		R	R		R
Peraclis													
Creseis conica				R									
Creseis acicula				R									
Atlanta				R									
Clio pyramidata				R								F	
Clio balantium			R										
Hyalocylix				R									
Peracles			F				F						
Clionopsis krohni								R					
Cymbulia												R	
Octopus (fragile red)			R										
Ostracods (orange)	F		F		M					R			
Gigantocypris (small)													R G
Copepods (pink, red)	M	R	F	M	F	M	F	F				C	F
Eucalanus	M			C	C		C			C		M	C

500—Fathom Plankton (*Continued*)

	59 T4	59 T9	61 T4	66 T2	74 T4	74 T8	74 T27	84 PT1	84 T10	84 T14	84 PT3	84 T20	86 T2
Calanids (small)	C												
Mysids (orange, red)			R		M							R	
Gnathophausia					R			C		C	C		R
Isopods (black)		R			F	F		R	F			R	F
Phronima		R		R				R					
Gammarids (orange, pink)		R		F		F	F			R			M
Gammarids (slate color)		R											
Oxycephalids						R	R						M
Euphausids (white)	C	M					F						C
Euphausids (pink patches)	F			F	M								
Schizopods (scarlet)								M					
Porcellana (larvae)								R					
Macrura (red and white)								C			C	F	R
Macrura (large, snow white)											F		
Eryoneicus								R					
Magalops (black, red)			R									R	R
Shrimps (small red)	R		F	F	R					R			
Shrimps (large red)	F		F		F								
Squilla (post larval)											R		
Salpa (small blue)													A
Salpa zonaria			R										
Doliolum	F												

550—Fathom Plankton

	74 T20
Atolla	F
Eukrohnia (red)	F
Diacra quadridentata	R
Eucalanus	A
Gnathophausia (small)	R
Mysids (red larvae)	R
Isopod (black)	R
Oxycephalids	R
Amphipods (fragile pink)	R
Euphausia (pink and white)	M
Benthophausia	F
Shrimp (small red)	R

600—Fathom Plankton

	59 T5	59 PT1	59 T10	59 PT2	61 T5	61 PT1	66 T3	66 PT1	68 T5	68 PT1	74 T5	74 PT1	74 T9	74 PT2	74 T16	74 PT3	74 T21	84 T21	86 T3	87 T5
Ctenophores											R				R					
Hydromedusae (pink)																	R			R
Bolina											F									
Periphylla					R				R		R			R		R				
Pleurobrachia						F	F													
Atolla												R								
Siphonophores											R									M
Diphyes													F							
Actinians (small pink)																			R	
Annelids (orange)					F						R								R	
Annelids (white)							R													
Sagitta (transparent)			F		F				F						F					
Sagitta (pink)	F	C	M	M	M	C	M	M	F		M	R	F		F			F		F
Tomopterus											R									
Nemertians (orange)																	R			
Firola			R			F	F	R		R	R				R	R				R
Atlanta	R						F													
Cymbulia			R	F				R										R		R
Hyalosylix striata			R																	
Clio pyramidata																		F		
Creseis acicula							F													
Cavolina uncincta							R	R				F				R	R			
Peracles															R	R	R			

600—Fathom Plankton (*Continued*)

Glaucus														R[1]						
Diacra quadridentata							R													
Squid		R			R															
Octopus (large fragile)							R													
Ostracods (orange)			R		F				R		M		R		R				R	R
Copepods (bathypelagic)					F													R		M
Copepods (large red)	F					R	M		C		M		R		F					
Copepods (intermediate zone)	M			F							M					F				
Eucalanus							C	M	C		C				A		A	C	C	M
Cypris (larvae)									F											
Mydids													R	F						
Gnathophausia (dark red)			F			F						F					R	F		
Gnathophausia willemoesia																		R	R	R
Isopods (black)	R		R										R						R	
Gammarids (pink)	F		R	F				F			R	R		R			F		F	R
Amphipods (slate color)	R				R															
Phronima (transparent)	F					F		R				R		R	R		R			
Phronima (purple)																				
Oxycephalids										F						F		F		
Euphausids (small white)	R	R	F		F				C											
Euphausids (red)			F		M		R	C	F	C	F	F	F	F	M	A	F	F	F	
Hippa (larvae)												R				R				
Sergestes (orange)																				R

600—Fathom Plankton (*Continued*)

	59 T5	59 PT1	59 T10	59 PT2	61 T5	61 PT1	66 T5	66 PT1	68 T5	68 PT1	74 T9	74 PT1	74 T9	74 PT2	74 T16	74 PT3	74 T21	84 T21	86 T3	87 T5
Phyllosomes							R													
Macrurans (red)						R					R							R		F
Benthophausia (red)																	F		R	
Shrimps (large red)	R	M		M			M	C	F	C	F	F		R	R	R	R	R		
Squilla (larvae)				R				R		C		F				F				
Doliolium						F				F										
Appendicularia						F														
Salpa zonaria (purple)																				
Halobates	R[1]						R[1]					R	R	R						

700—Fathom Plankton

	33 PT1	83 T22	84 PT4	87 T6	87 PT1
Actinians (larvae)		R			
Siphonophores					
Eucopa (deep wine color)				R	
Atolla wyvilli	R				
Halicrecas papillosum	F				
Homoconema typicum	R				
Aequorea globosa	R				
Siphonophore	R			M	
Annelids (yellow)		R			
Sagitta (transparent)	M				
Sagitta (salmon)	C	F		M	
Nemerteans		R			
Firola	R		R	R	R
Atlanta	R	R	R		
Cavolina tridentata				R	
Cavolina uncinata			R		
Clio pyramidata	R	F	C		
Clio cuspidata				R	R
Cymbulia		F	F		
Squid (red)		R		R	
Ostracods (pink)	R				
Gigantocypris agassizi			R		
Copepods (large pink)	M			F	
Eucalanus		M		M	
Gnathophausia			F		
Gnathophausia brevispinis				R	F
Mysis		R			
Amphipods (pink)	F				
Hyperids	R				
Oxycephalids			R		
Gammarids (pink)				F	
Macrurus (red and white)			M		R
Megalops (large)	R				
Porcellana (zoea)	R				
Zoea (long-spined)	R				
Benthophausia		R			
Shrimp (red)					R

700—Fathom Plankton (*Continued*)

	33 PT1	83 T22	84 PT4	87 T6	87 PT1
Squilla (larvae)	R	R	R		
Salpa cylindrica	R				
Euphausids		M	M	F	M

800—Fathom Plankton

	50 T3	50 OT1	53 T2	56 PT1	86 T4
Ctenophores					R
Annelids (pink)	R				
Sagitta (large transparent)	R		M	R	
Sagitta (pink)	F		R	R	F
Creseis conica	M		M		
Creseis acicula	F				
Clio pyramidata	F		R		
Clio balantium			R		
Hyalocylis	R		R		
Firola			R		F
Cymbulia					R
Ianthina	R[1]				
Squid					R
Ostracods (small orange)			R		
Gigantocypris			R		
Copepods (red)	M		M		M
Eucalanus	A				
Pontella	F				
Gnathophausia (red)			R	F	F
Isopod (black)	R			R	
Hyperids (white)	M				
Hyperids (red)				R	
Oxycephalids					R
Gammarids (orange)					M
Euphausids (red)			M	F	M
Schizopods (pink)	M				
Macrurans (red)			R	R	R
Benthophausia (orange)			R		
Shrimp (red)	R	R		F	
Squilla (larvae pink)		R			
Salpae	F				

1000, 1100, and 1200—Fathom Plankton

	1000 fathoms 86 T5	1100 fathoms 53 T1	1200 fathoms 50 T4
Beroe (small pink)			R
Atolla	F		
Pelagothuria	F		
Sagitta (large transparent)		F	M
Sagitta (pink)	F	F	
Firola	R		
Atlanta		R	
Cavolina longirostris		R	
Creseis conica		R	
Creseis acicula		R	
Notabranchia		R	
Hyalocylix striata		R	
Clio pyramidata			A
Eucalanus	C	A	
Gnathophausia (large red)	F		R
Isopods (black)	R		
Amphipods (pink fragile)			F
Gammarids (pink)	C		
Gammarids (orange)	F		
Oxycephalids	M		
Euphausid (pink)			R
Euphausids (white)	C	F	F
Porcellana (large)			R
Benthophausia (red)	F	F	
Shrimps (large red)		M	F
Squilla (post larva)			R
Ostracods (scarlet)	R		

VII. Relative Abundance of Fifty-seven Groups of Invertebrates In Pacific Surface Hauls

	Number of Occurrences in 47 Hauls	Abundant	Common	Many	Few	Rare	Relative Abundance based on 10–7–5–3–1 Ratio
Siphonophores	14	2	2	2	3	5	58
Porpita	13		1	2	8	2	43
Hydromedusae	6	1		1	3	1	25
Ctenophores	8	1		1	5	1	31
Liriope	5		2		2	1	21
Stomatoca derissa	3			1	2		11
Mneopsis	1	1					10
Pleurobrachia	1		1				7
Physalia	1					1	1
Sagitta	31	7	8	7	7	2	184
Annelids	3				2	1	7
Creseis conica	17		5	2	8	2	71
Creseis acicula	12		5	3	3	1	60
Atlanta	9	1		3	1	4	32
Glaucus	12			2	6	4	32
Ianthina	11			2	5	4	29
Diacra quadridentata	7	1		1	2	3	24
Firola	7		1	2	1	3	23
Gastropod larvae	2	2					20
Limacina	4	1	1			2	19
Hyalocylix striata	5			1	4		17
Squid	8			2		6	16
Clio	5			1		4	9
Cavolina uncinata	5				1	4	7
Cavolina longirostris	2				1	1	4
Cymbulia	2					2	2
Peracles	1					1	1
Pneumoderma boasi	1					1	1
Euphausids	30	6	9	4	11		176
Pontella	30	2	6	11			117
Copepods, small	13	7	4	1	1		106

Relative Abundance of Fifty-seven groups (*Continued*)

	Number of Occurrences in 47 Hauls	Abundant	Common	Many	Few	Rare	Relative Abundance based on 10–7–5–3–1 Ratio
Megalops	19	3	1	4	8	3	84
Phyllosomas	18	2	3	3	5	5	76
Hyperids	17	1	3	3	7	3	70
Squilla larvae	15	1	2	2	5	5	54
Lucifer	12	1	1	4	5	1	53
Zoea	10	2	1	1	2	4	42
Amphipods	8	1		2	5		35
Eucalanus	10	1		2	4	3	35
Mysids	6	1	2		3		33
Calanus	3	3					30
Monops	7		2		4	1	27
Schizopods	3	1	1		1		20
Sapphirina	3		1	1	1		15
Macrurus larvae	3		1	1	1		15
Candace	3		1		1	1	11
Acartia	1	1					10
Ostracods	1		1				9
Isopods	4				1	3	6
Gammarids	1				1		3
Hippa larvae	3					3	3
Sergestes larvae	2					2	2
Phronima	1					1	1
Halobates	27			5	21	1	89
Salpae	13	3	5		4	1	78
Doliolum	1				1		3
Pyrosoma	1					1	1

VIII. Relative Abundance of Six Major Groups of Invertebrates In Forty-seven Surface Hauls in the Pacific

Crustacea	1033	52.4 per cent
Mollusca	367	18.7 per cent
Coelenterata	207	10.5 per cent
Annelida	191	9.7 per cent
Insecta	89	4.5 per cent
Urochorda	82	4.2 per cent